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Heil, K.D., S.L. O'Kane, L.M. Reeves, and A. Clifford. 2013. **Flora of the Four Corners Region, Vascular Plants of the San Juan River Drainage: Arizona, Colorado, New Mexico, and Utah.** (ISBN 978-1-930723-84-9), hardcover. Monographs in Systematic Botany from the Missouri Botanical Garden, Vol. 124. Missouri Botanical Garden Press, St. Louis.

Let's cut to the chase: BUY THIS BOOK! Whether you live in, near, or far from the Four Corners, and whether you are a book collector, a casual observer of wildflower beauty, a budding amateur botanist, or a professional working in the field, you will more than enjoy owning this masterfully created book.

Facts: The book was 15 years in the making after the scheme was hatched over lunch at the Elk Ridge Café in Blanding in 1996. Major collectors were Ken Heil, Steve O'Kane, Arnold Clifford, and Wayne Mietty, with considerable assistance from Rich Fleming, Cyndie Holmes, Dave Jamieson, Les Lundquist, Lynn Moore, J. Mark Porter, Tim Reeves, and Glenn Rink. The list of 60+ major contributors (especially those writing the individual keys and descriptions) reads like a who's who of botany. The highly respected botanist Peter Raven, of decades at the Missouri Botanical Garden (which published the *Flora*), praises the *Flora* in his Foreword: This is an "outstanding flora ... I congratulate the authors, illustrators, and editors on a job exceedingly well done."

The 4 pound *Flora* covers the Four Corners region drained by the San Juan River from its headwaters at the Continental Divide at 4,292 meters to its confluence with the Colorado River at 1,130 meters, an area of 65,382 square kilometers — the size of West Virginia. The Flora covers this region in 1098 pages and catalogues 120 families and 2,355 taxa (41 endemics). There is a Glossary of 32 pages and over 23 pages of Literature Cited. The heavy stock pages are graced with 118 of Steve O'Kane's superb photographs splendidly reproduced; 200 lovely and valuable line drawings, almost all by Linda Reeves; eleven mesmerizing color botanical illustrations (some full-page) by Carolyn Crawford; a most unusual and ethereal set of fifteen Glenn Vandre landscape watercolors of the vegetation associations and life zones covered by the *Flora*; and inside the front and back covers are full-sized political, topographic, and river maps of the area covered. The type face is large and easy on the eyes. All of this is wrapped in a very handsome dust cover with picture sandstone on the front and an exciting full-color collage of the area's flora and terrain on the back.

From what I have told you so far, you already should be writing your check, but wait, let me tell you much more. The introductory material very nicely contains the expected scope of the project, methodology, geology, climate, plant communities, etc. But we also get an unexpected number of other pieces of very thoughtful and welcomed information: a two page list of historical collectors in the San Juan area, a list of endemics, 1½ pages defining "weed," plant migration routes, and definitions of measurements, such as "Flower length = Point of insertion of the pedicel to the apex of the longest petal."

Because the *Flora* just came on the scene in September, 2013, I have not had much time to work with its heart and soul, the keys and descriptions, but those I have used and examined are compact, accurate, and helpful. For example, plant keys often require discriminating between annual and perennial plants, but how are we to do that? Certainly most of us can tell a perennial tree from a *Gilia* but how about a *Gilia* from an *Ipomopsis*? The opening of the *Lupinus* key gives us assistance with that genus by asking us about its cotyledons:

1. Plants annual, the cotyledons commonly persistent
1' Plants perennial, the cotyledons not present at flowering

And let's have a standing ovation for the *Salix* keys, yes, plural "keys:" vegetative, pistillate, and staminate keys.

The complete plant descriptions make it easy for the reader to focus in on specific plant parts by capitalizing and bolding key words (**STEMS, LEAVES**, etc.). The complete descriptions also include the etymology of the specific epithet, synonyms, habitat, associated plant communities, a list of all the counties in the Four Corners area where the plant has been found (really amazing!), elevation range, flowering time, entire USA range, unusual characteristics, and Native American uses.

Nothing is perfect; what are some of the problems in the *Flora*?

* Any reference book published today should provide a web address for comments and corrections to be posted. Weber and Wittmann's new *Colorado Flora* does not provide a web address, Allred's new *Flora Neomexicana III* does not, and following in this unfortunate pattern, Heil and O'Kane's *Flora of the Four Corners Region* does not. How are we to know of mistakes in these books, such as, those I point out below and the ones that you will find? [I am pleased to say that a web page has now been established. Please make a note in your copy of the *Flora of the Four Corners Region* and send your corrections to <coloradowildflowers@yahoo.com>. These corrections will be posted at <http://www.swcoloradowildflowers.com/floraofthefourcornersregion.htm >.]

* In some ways the large number of contributors that I mentioned above is good: we get the top experts in each family writing the descriptions. But in other ways, confusion can result – and does. For example, the Angiosperm Phylogeny Group (APG) recommendations are followed by some contributors (for Scrophulariaceae) but not others (for Chenopodiaceae). Be prepared to be flexible and speak several botanical languages.

* *Colorado Flora* very nicely indicates where its treatment of a family, genus, or species is in conflict with the treatment in the monumental *Flora of North America*. That same contrast and comparison definitely should have been carried out in the *Flora of the Four Corners Region*.

* I find it very unfortunate that the keys do not provide a way for you to backtrack when you make a mistake in keying. If, for instance, you arrive at choice #27 in a key and you realize that you are in the wrong place, there is no indication about what number you were at before #27. You cannot easily retrace your steps. Look at Weber and Welsh's floras; they both provide this thoughtful and time and frustration-saving numbering in brackets [ ].

* I am quite puzzled by the choice of plants that have line drawings. Let's look at the major genera in our area: *Astragalus*: out of 73 taxa there are 11 drawings, all but 2 or 3 are drawings of rare or very uncommon plants; *Erigeron*: out of 39 taxa there are only two drawings, both of very uncommon plants; *Eriogonum*: out of 37 taxa there is just one drawing of an uncommon *Eriogonum*; *Penstemon*: out of 28 taxa there is just one drawing of a common *Penstemon*; *Poa*: out of 23 taxa there is but one drawing of a common *Poa*. There are no drawings of any *Allium, Carex, Castilleja, Draba, Gilia, Mertensia, Oenothera, Ranunculus, Senecio,* etc. etc. (And while we are on the line drawings, it sure would have been nice to have a ruler on each drawing. The point of the drawings is not just to look good (which they certainly do) but also to help identify.)

* The glossary gives fine definitions (and has some very unusual and welcomed entries, such as, Hawkmoth, disjunct species, relict species, Ramah Navajo, Piki, Park, sub, tuff, Ant Lion, and 2 definitions of herb), but the glossary omits some necessary entries: inflorescence, villous, limb, spp., sp., ssp., dorsal (but ventral is there!), sori, sporophore, trophophore. Scale, awn, and bristle are not defined sufficiently to assist with keying Asteraceae.

* Other problems: Weber, Kearney and Peebles, Welsh, Heil and O'Kane (in their on-line checklist), and Allred all indicate that *Ephedra cutleri* and *Yucca harrimaniae* both occur in the Four Corners area; neither plant is in the new *Flora of the Four Corners Region*. What else is missing?

The etymology of *Botrychium* provided by the *Flora* really causes a head-spin and chuckle: from the Latin 'botry,' meaning a 'bunch of grapes' + 'oides,' meaning 'like.' There obviously is no "oides" in

the word "Botrychium." The ending "ium" is from the Latin "ion," a diminutive, thus the meaning is "a bunch of small grapes."

The problems I have pointed out are the inevitable cost of being human; we make mistakes. The excellence of *Flora of the Four Corners Region* enormously outweighs the few errors, but the inevitability of these errors just confirms to me the need for a web site that would correct the mistakes.

OK, I have convinced you to buy the *Flora*, but how much is such a fabulous work of science going to cost you and where should you buy it? The Missouri Botanical Garden price is only $72. However, check out **www.exoticplantbooks.com** (go to the "new/specials" link) and you will find it for $57.60 plus only $2.45 for postage. Get your native plant society to register with Exotic Plant Books and your society will receive a credit for 10% of what you spend. The New Mexico and San Juan/Four Corners Native Plant Societies are registered. The latter has, over the past two years, accumulated enough credits to get 13 free copies of Weber's *Colorado Flora*, which have been given to Fort Lewis College students.

After approximately 20,000 miles of walking, 150 miles of horse riding, and 150,000 miles of driving to, from, and on field trips to collect over 23,000 specimens (including 1,700 county records, 42 state records, and 17 new species), Ken and Steve deserve a great Thank You from us and a long rest for themselves. The former they have been receiving; the latter they have not taken, for they immediately began work on a flora of New Mexico, and if all goes well we can expect that in the next few years.

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